

EVALUATING FACTORS THAT LIMIT DABBLING DUCK PRODUCTION

GENERAL

This technical note is intended to orient field staff to approaches for identifying factors limiting the production of dabbling ducks. The concepts presented are intended to assist the landowner in making management decisions when relatively little is known about the biology of breeding dabbling ducks and their habitat. Additional technical assistance is available from the Minnesota Department of Natural Resources (DNR) Area Wildlife Manager, or US Fish and Wildlife Service (FWS) biologists.

Many dabbling ducks in North America show similarities in their breeding behavior and requirements. Dabbling ducks are "surface feeders", feeding in shallow water or using grain and seeds from croplands. Twelve species of ducks commonly nest in the prairie pothole region. In Minnesota, the mallard, and blue-winged teal are most common. Other dabbling species are the pintail, gadwall, American widgeon, northern shoveler, green-winged teal, wood duck. Most of these species prefer nesting in grasslands. Production of these ducks is highest in prairie potholes, but also occurs in many situations if water is present.

Most ducks arrive on their breeding grounds from late March to early May. Mallards and pintails arrive first, followed by gadwall, shovelers and teal. Shortly thereafter, they begin to make use of wetlands that vary in size, water permanency, and vegetative composition. Species vary in time of nesting, but by mid June, approximately 60% of the nests have been initiated. This variety of wetlands, together with the surrounding uplands constitute the home range of individual pairs. A diverse wetland community is critical to reproductive success. By moving among wetlands and selecting those with the most abundant invertebrates, ducks are able to quickly acquire the protein necessary for egg production. A diversity in wetland types also allows breeding pairs to isolate themselves where they can secure resources for breeding, and are relatively undisturbed by other birds. Thus, small shallow wetlands contribute more to ducks during the breeding season as large, permanent wetlands.

FACTORS LIMITING DUCK PRODUCTION

Factors limiting duck production can result from deficiencies independent of the breeding habitat, for example, food shortages on wintering areas, natural variations of climate, and man induced changes in the landscape. However, most factors can be traced to three important requirements: **the ability to attract and retain spring migrants, adequate nesting cover, and suitable brood rearing habitat.** Along with annual variation in water abundance, the intensification of agriculture, which has resulted in the drainage of potholes and destruction of upland nesting cover, probably has been the most dominant factor affecting the distribution, abundance, and reproductive success of Minnesota's ducks.

Once limiting factors are identified, management recommendations often can be developed to correct the deficiencies. Refer to Figure 2, "General Management Alternatives For Addressing Factors Limiting Duck Production", and NRCS Standard 644 "Wetland Wildlife Habitat Management" for management recommendations. Not all wetlands are suitable waterfowl breeding habitats. Equally as important are migratory stopover and loafing areas which provide essential resources for migratory birds. Planners should avoid modifying these areas to create breeding habitat if doing so would impair these other seasonal uses, or result in excessive costs. Restoration/enhancement of previously hydrologically drained or degraded wetlands are preferable to creation.

ABILITY TO ATTRACT AND RETAIN SPRING MIGRANTS

The major influencing factors for dabbling duck production in Minnesota is the availability of an assortment of wetland types, water permanency, and their ability to provide an abundance of food sources for spring migrants, as well as brood water to raise young. Studies of breeding pairs indicate that arriving ducks are most attracted to wetlands less than 2 acres in size. This concept of a wetland complex is vital.

The planning area must contain saturated, temporary, or seasonally flooded wetlands to provide early nutritious food sources in the form of invertebrates, including insects, crustacea, and molluscs. These wetland types thaw out earlier in the spring than more permanent wetlands. They provide isolation and open water for breeding and courting ducks during the spring breeding season.

Also important, in addition to territorial areas, are adequate brood areas. These areas provide permanent water for hens to brood and raise their young. Ideal brood areas include seasonal and semi-permanent wetlands, while shallower portions of permanent wetlands are also used.

Other factors to be considered when evaluating the attractiveness of dabbling duck habitat are the fertility of the watershed, and the size of the area proposed for management. Production of individual wetlands may be estimated by recognizing the predominant soils present in the watershed. Medium and fine textured soils are more productive than coarse textured or peat soils. Suitable waterfowl breeding areas should occur in large, unbroken blocks of habitat greater than 40 acres.

Summary:

1. With a goal of waterfowl production in mind, the planning unit must provide, or be capable of providing a complex of temporary, seasonal, and semipermanent wetlands.
2. Maximum potential production occurs in watersheds consisting predominantly of medium and fine textured soils.
3. Wetlands most attractive to breeding dabbling ducks are under 2 acres in size, and contain about a 50:50 ratio of open water to emergent vegetation.

ADEQUATE NESTING COVER

Nesting in early migrating species usually starts before much plant growth has been achieved. Most nests are made in dead vegetation remaining from the previous growing season. Residual carryover of the previous seasons vegetation is important to achieve successful nesting.

Predator losses, and destruction by haying or cropping are major causes of nesting losses. Associated effects result from the concentration of nesting ducks in very limited habitat, such as fence rows, roadsides, and narrow fringes around potholes, and shifts in predator communities with intensive farming. These losses can be reduced in part, by providing dense herbaceous cover in large unbroken blocks. As density and height of nesting cover decreases due to haying, unmanaged grazing or other causes, nesting success also decreases. Intensive grazing or haying prior to July 15 or after September 1 increases predation and leaves little residual cover for the following spring. High quality nesting cover should be dense and diverse, and a minimum of 18 inches in height.

Quality of nesting cover influences duck production in yet another way. Blocks of nesting cover should be larger than 40 acres. Blocks of nesting cover, such as circles or squares that minimize the amount of edge are more effective than narrow fields of the same acreage. Generally, nest success rates greater than 40% are acceptable, whereas rates lower than 15% are usually insufficient to maintain a stable duck population.

Summary:

1. Quality nesting cover consists of dense, diverse, and tall herbaceous vegetation. Disturbance due to haying, intensive grazing or cropping greatly decreases nesting success.
2. Optimum nesting cover height is ≥ 18 inches.
3. The planning/management unit needs to be of adequate size to consistently produce dabbling ducks. Unbroken blocks larger than 40 acres is required. A configuration of a circle or square is most productive.

SUITABLE BROOD REARING HABITAT

Brood areas consist of temporary, seasonal, semi-permanent wetlands, and fringes of permanent wetlands. These wetlands provide conditions necessary for hens to brood and raise young relatively safe from predators and disturbance. This may be furnished by cover sufficient to conceal the brood, or by open water of sufficient size so broods can escape predators. Studies indicate that broods prefer wetlands greater than 1 acre in size, an equal interspersion of open water and emergent vegetation, and water depths greater than 6". The use of wetlands by broods also increases as the number of plant species at the edge of the open water zone increases.

Studies also indicate that managed grazing of cattail and Phragmites choked wetland margins create openings which may increase brood use.

Newly hatched ducklings leave the nest soon after hatching, and may walk through uplands to brood rearing wetlands up to 2 miles away. The first two weeks are critical to duckling survival. Predation and exposure can cause high mortality among ducklings. In many situations, 20-50% of all duck broods are entirely destroyed, and typically only about one-half of the ducklings in the remaining broods survive. Generally, an average of five ducklings per prefledging brood is considered acceptable attrition.

This situation underscores the importance of a wetland complex. Ducklings hatched near a shallow, temporary wetland can remain there through the critical two week period, and travel to a more permanent wetland after they gain strength.

Summary:

1. Wetlands of a more permanent water regime are necessary for hens to raise their young relatively free from disturbance.
2. Wetland complexes are vital to brood survival. Broods which have to travel in excess of 1 mile from nest to brood water, typically experience mortality rates of 75% or more.
3. The leading causes of mortality are: predation, exposure, starvation, or death from pesticides/contaminants.
4. Broods prefer wetlands greater than 1 acre in size, good interspersion of open water and emergent vegetation, and a water depth greater than 6".

The worksheet located in Appendix A, "Evaluation and Management Recommendations for Dabbling Ducks" may be used to determine production limitations and management needs. Planning units which lack the above criteria, or the components occur in limiting quantity/quality, should be considered as limited potential for consistent waterfowl production. These areas are best managed for migratory feeding, loafing, and staging areas.

REFERENCES

- Ball, I.J. et al. Survival of Wood Duck and Mallard broods in North Central Minnesota. *Journal of Wildlife Management*. Vol. 39.
- Cowardin, L.M., Classification of wetlands and deep water habitats of the United States. US Fish and Wildlife Service Off. Bio. Ser. FWS/OBS79/31.
- Higgins, K.F. Duck nesting in intensively farmed areas of North Dakota. *Journal of Wildlife Management*. Vol. 41.
- Kantrud, H.A., Effects of vegetation manipulation on breeding waterfowl in prairie wetlands. A literature review. US Fish and Wildlife Service, Technical Report #3.
- Kantrud, H.A., G.L. Krapu, G.A. Swanson. Prairie basin wetlands of the Dakotas: a community profile. U.S. Fish and Wildlife Service Bio. Report 85(7.28).
- Kirsch, L.M. Waterfowl production in relation to grazing. *Journal of Wildlife Management*. Vol. 33.
- Minnesota Department of Natural Resources. Ducks and Landuse in Minnesota.
- Moyle, J.B. Relationships between the chemistry of Minnesota surface waters and wildlife management. *Journal of Wildlife Management*, Vol. 20, #3.
- Sowls, L.K. Prairie Ducks. The Stackpole Company.
- US Fish and Wildlife Service. Waterfowl Management Handbook.
- van der Valk, A.G. Northern Prairie Wetlands. Iowa State University Press.

Appendix A

EVALUATION AND MANAGEMENT NEEDS FOR DABBING DUCKS IN MINNESOTA

Complete parts I, II, and III of the worksheet to determine relative production limitations, and needed management efforts to produce dabbling ducks on individual farms or groups of farms in Minnesota.

Upon completion of parts I, II, and III, production potentials, management needs, and alternatives can be compared. Refer to Figure 2, "General Management Alternatives For Addressing Factors Limiting Duck Production", and NRCS Standard 644 "Wetland Wildlife Habitat Management" for management recommendations.

PART I - Ability to attract and retain spring migrants

Circle the appropriate rating for each factor

A. Watershed characteristics (refer Figure 1)

	Loamy/Clayey	Coarse
Prairie	1.0	0.5
Broadleaf Forest/Transition	.75	0.3
Mixed Forest	0.1	0.1

B. Wetland bottom material

Silty - Loamy	1.0
Mucky - Clayey	0.6
Peats	0.3
Coarse	0.1

C. Quality of wetland complexes: ratio of PEM(A,B,C) to PEM(F,G,H)

≥3:1	1.0
1:1-3:1	0.7
.5:1-1:1	0.4
≤.5:1	0.1

D. Upland to wetland ratio, relative to permanent cover

Ratio	% of upland consisting of undisturbed herbaceous cover			
	100-75	75-50	50-25	≤25
≥4:1	1.0	0.8	0.6	0.3
3:1	0.8	0.6	0.4	0.3
2:1	0.7	0.5	0.3	0.1
≤1:1	0.4	0.3	0.2	0.1

E. Ratio of vegetation to open water in PEM(C,F,G) wetlands

1:1	1.0
.5:1 or 1.5:1	0.7
<.5:1 or >1.5:1	0.2

F. Size of management unit (acres)

>80	1.0
40-80	0.7
≤40	0.3

Determine the relative potential for attracting and retaining ducks using the following formula:

$$\frac{A + B + C + D + E}{8} \times F$$

Part II - Suitable nesting cover

Circle the appropriate rating for each factor

A. Attractiveness of nesting cover

Native species mix (≥ 3 species)	1.0
≤ 2 native species or grass legume mix	0.7
Introduced cool season grass	0.4
Other possibilities	0.1

B. Average vegetative cover height - April 1

$\geq 18"$	1.0
8"-12"	0.8
4"-8"	0.5
$\leq 4"$	0.2

C. Average distance of travel from nest to nearest wetland

Distance	Wetland Type	
	Lake, PEM(C.F.G)	PEM(A.B)
$\leq 660'$	1.0	0.9
660'-1320'	0.8	0.7
1320'-2640'	0.6	0.5
$\geq 2640'$	0.3	0.2

D. Predation factor: assumes no active predator management. Refer to Figure 1 for general waterfowl-predator relationships. Adjust factor accordingly if active predator management exists, is planned, or more site specific data is available from the MDNR Area Wildlife Manager.

Mixed forest region	1.0
Broadleaf Forest/Transition region	0.5
Prairie region	0.1

E. Configuration of nesting cover (ave. width of nesting cover)

$\geq 1320'$	1.0
660'-1320'	0.8
100'-660'	0.6
$<100'$	0.2

Determine relative quality of nesting cover by using the following formula:

$$\frac{A + B(3) - C - D}{6} \times E$$

Part III - Identify limiting factors and management recommendations

Compare the results of parts I and II and determine limitations to duck production. In general, the quality or potential quality is rated as follows:

Index	Relative Quality
< 0.3	Poor
0.3 - 6.9	Good
0.7 - 1.0	Excellent

Planning units which lack the required components, or occur in limiting quantity/quality should be considered as having limited potential for consistent duck production. These areas are best managed for migratory feeding, loafing, and staging areas, or other identified functions and values.

Watershed Characteristics and Waterfowl Predictor Relationships

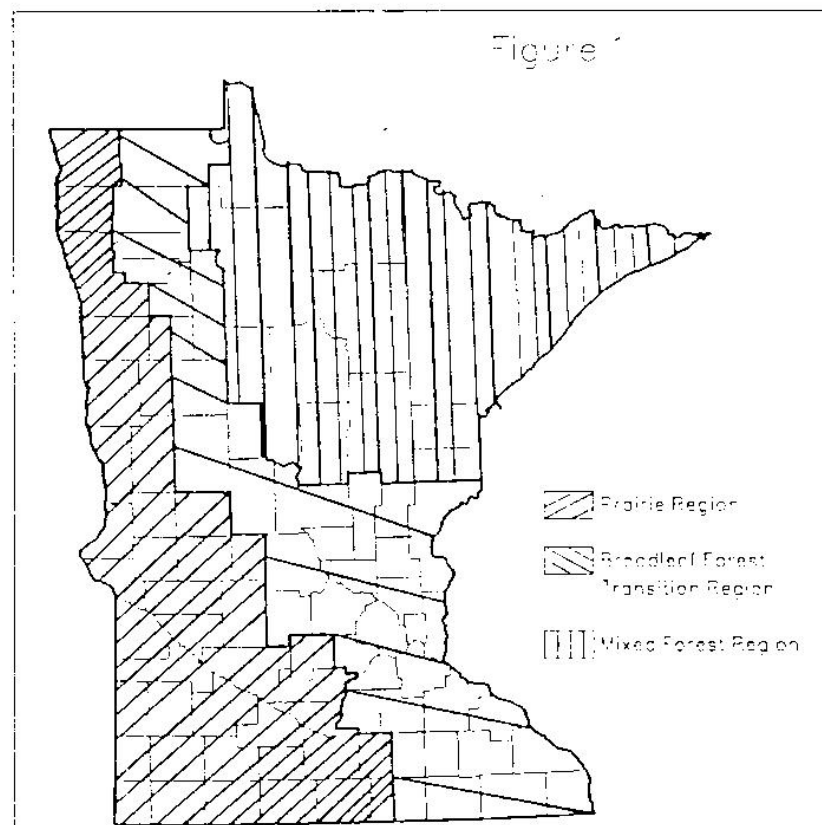


Figure 2

General Management Alternatives for Addressing Factors Limiting Dabbling Duck Production

